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A GEOLOGICAL SKETCH, WITH NOTES ON THE GEOLOGY OF THE MANITOU ISLANDS OF LAKE NIPISSING, ONTARIO.

BY J. M. GOODWILLIE, OTTAWA, CANADA.

GEOLOGY is that particular branch of scientific study which treats of the history of the earth; its organization and structure, the materials of which it is composed and the various processes by which it has attained its present constitution.

The term Geology is derived from two Greek words: *ge*, the earth, and *logos*, a history or description.

As history, we must consider it apart from the records of human action and human progress,—a history disclosed to us by the record and study of the rock masses which lie around us and beneath us, and by comparing the results of the natural phenomena of the past with the numerous forces and agencies at present in operation, in modifying the surface of the globe.

By the term *rock*, in geology, is not to be understood merely that hard material which we commonly call stone, but it is employed to include everything of which the earth's crust is composed. The sand and gravel of our lake shores, the clays employed in the manufacture of brick and earthenware, the limestone and marble and sandstone of our provincial quarries, the pebbles and boulders by the roadside, and the soil of which our gardens and farms are composed are all, geologically speaking, rock, equally with the granite of our hills and mountains.

The determination of the materials of which rocks are composed belongs to the department of mineralogy and which, although not identical with geology, is closely allied to it.

Geology endeavors to account for the rock masses and various materials of which the earth is constructed. It aims at answering the enquiry, how have these things been formed and what are the processes by which they exist? Mineralogy examines into the nature and character of the materials, and analyzes and resolves into its component parts the various ingredients of which a rock is composed.

The study of geology reveals the fact almost everywhere patent in our surroundings, that we live in the midst of a rocky area, which upon investigation, proves to belong to the oldest known rocks in existence, and forms what we might term the foundation stones of the superstructure of our world.

Mineralogy shows us what the rocks contain, whether

iron, or copper, or galena, or nickel, or silver, or gold, or platinum, and the modes of their occurrence; so that by a careful study of the conditions in which they are usually found, the investigator and prospector may be saved much unnecessary expenditure of time and labor in searching after the concealed wealth which lies hidden from the easy observation of man.

Geology does not attempt to account for the origin of the world, but the careful study of it gives us the only intelligible solution that can be entertained of the causes which must have operated in producing its present appearance, and the diversity everywhere apparent in its structure.

To a higher than any human source must we look for an answer to the inquiry into the origin of the world. In the sublime and indisputable declaration with which the book of Divine Revelation opens, there is given us the only satisfactory answer that can anywhere be found and which must forever prove sufficient, not only as it relates to this terrestrial sphere, but also to the universe of unenumerated worlds of which this earth is, comparatively speaking, only an insignificant part: "In the beginning God created the heavens and the earth."

In that opening announcement of the book of God we are not only carried back to an indefinite, and it might be said an almost unlimited period, but we are also reminded that He who by his own almighty word "spake and it was done," and "commanded and it stood fast," did not then create the world as it at present exists. We are reminded that there was a time when the earth was without a human inhabitant, when no rain had yet fallen upon it, and when "there was not a man to till the ground." There was a time, further back, when our forests were uninhabited by wild beasts, and our marshes and lowlands untenanted by the almost numberless creeping things which make these resorts their abode. There was a time, still further back, when our streams and lakes and seas were without inhabitant, when there were no monarchs of the deep to engage in bloody encounters, and contest with each other the right of occupancy, and when there was no fowl of any kind to fly in the heavens, nor songsters to awaken the morning with notes of rejoicing and triumph.

There was a time, yet more distant, when the earth was destitute of vegetation of any kind, when no forests clothed our hills and mountains, when no grasses grew upon our plains, nor made verdant the valleys of our water courses, and when herbs, and fruits and flowers had not yet begun an existence preparatory to the introduction of animals and of man in particular.

There was a time, still more remote, when no mountain chains existed, with here and there lofty peaks penetrating the clouds and towering high towards heaven, and when there were no hills with accompanying valleys hollowed out among them.

There was a time, more distant still, when the earth appeared as one vast expanse of boundless sea, when islands and continents had not appeared above the surface of the great and mighty ocean, when "darkness was upon the face of the deep," and when, in all the illimitable dreary waste of waters, life and animation were entirely unknown.

Step by step the Creator was gradually preparing the earth to be the residence of the human race. Slowly and deliberately He brought about the necessary changes, all of whose workings are particularly distinguished by the absence of that spirit of haste and restless impatience so commonly manifested in the undertakings of man.

The time occupied in bringing about the present condition of things, as apparent throughout the world, must have been an indefinitely long period. Sacred science,